Indications for Operation in Glaucoma

ROBERT N. SHAFFER, *M.D.*, San Francisco

• **Prompt surgical operation is indicated in angle-closure glaucoma and in infantile glaucoma. Open-angle glaucoma is properly considered a disease for which conservative treatment should be tried.**

Operation is indicated in open-angle glaucoma when, despite maximal medical therapy, the intraocular pressure reaches a level at which the optic nerve is going to be damaged. Many factors must be considered in making a decision as to whether or not to operate in such circumstances, among them the condition of the eye, the result of previous operation if one has been done, the reliability of the patient with regard to carrying out a prescribed regimen, the age and physical condition of the patient, perhaps the race of the patient, the presence of cataracts and the attitude of both patient and surgeon toward surgical treatment.

SURGICAL OPERATION for glaucoma is indicated when, despite maximal medical therapy, the intraocular pressure reaches a level at which the optic nerve is going to be damaged, but putting that simple principle into practice can be one of the most vexing problems in ophthalmology. There are some conditions in which the indications can be stated positively and other conditions in which no clean-cut decision can be made. It is the purpose of this paper to present some of the criteria which are useful in reaching a reasonable decision.

The two types of glaucoma in which the indication for operation is nearly absolute are infantile glaucoma and angle-closure glaucoma. Rarely is true infantile glaucoma spontaneously resolved; most patients not successfully operated upon lose their sight. Inherent in the diagnosis of infantile glaucoma is a recommendation for prompt goniotomy.

In angle-closure glaucoma with pupillary block there is also an almost absolute mandate to operate. The mechanism of relative pupillary block which results in most primary angle-closure glaucoma is well understood. It is also accepted that iridectomy permanently protects the eye from further attacks of angle closure. The situation is almost unique in that truly curative surgical operation is possible if it is performed before permanent peripheral anterior synechia or trabecular damage has been produced. Therefore, iridectomy is indicated in any case of angle closure as soon as pressures can be brought into normal range by medical treatment. Even if only one eye is affected, prophylactic iridectomy probably should be done in the other.

There are few absolutes in medicine, and qualifications to the rule for iridectomy immediately come to mind. Exceptions depend to a large degree on the gonioscopic findings. If the angle opens to a full grade 2 when miotic drugs are given, the need for operation is less urgent. A patient who is elderly or in poor health, or who has strong objections to surgical operation, may be maintained by drug therapy provided he is reliable about taking drugs as prescribed.

The narrower the angle, the more imminent is angle closure, and the more urgent the need for iridectomy. When properly performed, peripheral iridectomy is as safe as any intraocular operation can be, taking into account the final qualification: the surgeon must be highly skilled.

Indications for operation in chronic open-angle glaucoma are not as clear-cut as for the angle-closure form. Operation does not cure open-angle glaucoma. Often, reducing tension is accompanied by decreased visual acuity due to corneal changes, chronic iritis or lens opacity. When one adds to this the fact that about 25 per cent of filtering operations are unsuccessful, it is easy to see why ophthalmologists prefer to control pressures medically if possible. Operation is obviously indicated when consistently high intraocular pressures are associated with cupping of the disc and progressive changes in the visual field. There are many other cases in which the decision can be made only by the careful evaluation of many factors. The factors to be considered are as follows:

Optic disc. A healthy, pink disc with no cupping is a most favorable finding. It is believed that such a nerve will withstand increased pressures longer than will a cupped disc. In all cases, discs should be diagrammed or photographed so that changes in cupping with the passage of time can be recognized. The more severely cupped and atrophic the optic nerve head, the more urgent is the need to normalize the intraocular pressure.

Field changes. Progressive changes in the visual field in the presence of tension elevation are usually

Presented before the Section on Eye at the 91st Annual Session of the California Medical Association, San Francisco, April 15 to 18, 1962.

considered reason for operation. One must be sure that the changes are actual and not the result of changes in technique of examination, in technicians, in test object or in lighting, and that they are not due to intraocular complication such as cataract formation, retinal detachment or retinal disease. Miosis of the pupil produced by the strong miotic drugs will sometimes exaggerate an existing field defect. It is also wise to correlate the apparent field change with the appearance of the optic disc. A pronounced field defect in the presence of a healthy, pink disc casts doubt on the accuracy of the field examination.

Tension. The higher the tension the more certain it becomes that damage to the nerve is going to occur. With normal discs and fields, tensions even up to the level of 40 mm. of mercury may be tolerated. However, most ophthalmologists become increasingly alarmed as tensions go above 30 mm. If the optic disc has already been damaged, operation should be performed promptly if the pressure runs above 24 mm. or there is the least sign of progression of disc or field changes.

In terminal glaucoma the field may be limited to the few degrees around fixation. Obviously, any further progression of the field defect will extinguish macular vision. For determining when operation must be done in such circumstances, reliance must be placed on the tension elevations. If pressures are consistently running between 24 and 30 mm. of mercury (Schiotz), it is wise to do a filtering procedure on one eye, then on the other if the result is favorable. If there is but one eye, it is wiser not to operate unless the tension is frequently above 30 mm. of mercury (Schiotz). Surgical intervention risks macular hemorrhage or edema, which may result in total loss of central visual acuity. As a rule, however, an eye of this description will tolerate operation.

Narrowness of the angles. Narrowness of the angles is seldom a problem in open-angle glaucoma. In a few cases, however, there may be an angle so critically narrowed that the use of strong miotic agents or epinephrine entails risk of angle closure. Such a situation may require surgical intervention. Even if a filtering operation fails, the accompanying iridectomy permits a more energetic medical regimen.

Reliability of the patient. Operation is indicated in those patients who are mentally, physically or psychologically unable to carry out the disciplined therapy necessary for medical control of open-angle glaucoma.

Age and physical condition of the patient. In pre-presbyopic patients, the severe blurring of vision caused by miotic agents often results in irregular use of the drops and ineffective therapy. Although the optic nerve in the young seems to be more resistant to damage, any loss that does occur in them is the more alarming because of their long life expectancy. The younger the patient, the more probable it is that operation will become necessary.

The elderly are often more understanding of the nature of chronic illness and of their personal responsibility in maintaining visual function. Hence for the most part they accept a medical regimen with more determination and tolerance. If operation becomes necessary, it seems to be more likely to result in a filtering bleb because of the paucity of subconjunctival connective tissue and decreased reactivity of the tissues. On the other hand, there is an increased risk of postoperative cataract formation.

The race of the patient. Most surgeons believe that filtering operations are less likely to be effective in the Negro race than with Caucasians or Orientals.

Presence of cataracts. The presence of lens opacities is frequently a complicating factor in glaucoma. In angle-closure glaucoma it is almost a welcome finding, for removal of the lens deepens the anterior chamber and widens the angle if peripheral anterior synechias have not formed. In this way one procedure cures the glaucoma and restores vision.

In open-angle glaucoma, a filtering procedure is likely to result in rapid progression of pre-existing lens opacities. Furthermore, if the glaucoma operation is successful its filtration may be spoiled by subsequent cataract removal. Therefore, in general it is better to remove a cataract before a glaucoma operation is performed if vision is less than 20/50 and tension is not consistently above 35 mm. of mercury.

Previous Operation. There is an ophthalmologic maxim, "As the first eye goes, so goes the second." When good filtration develops in one eye after operation, the outlook for a favorable result in the other eye is improved. Conversely, if good filtration is not brought about by a technically well done procedure, the case for medical treatment is strengthened.

Attitude of the patient and of the surgeon. Of all the imponderables, the attitudes of the patient and of the surgeon are the most difficult to assess. There is no doubt that operation is undertaken much later on patients who are reluctant to undergo the procedure than on those who welcome it. The surgeon's attitude is often influenced by the success or failure of his most recent filtering operations rather than by a dispassionate evaluation of the facts.

COMMENT

The present concept of angle-closure and infantile glaucoma as surgical diseases, and of open-angle glaucoma as a medical disease, seems to be well founded. A note of caution should be sounded, however: Sometimes the eyes of a patient with open-angle glaucoma are permitted to lose function while the patient is being treated with miotic agents, carbonic anhydrase inhibitors and epinephrine in various proportions, combinations and timings. This exploratory use of the medical agents is legitimate but should be completed promptly. It takes only a few days to determine whether or not a given combination is effective. The urgency with which the search should be pursued depends on the severity of the intraocular pressure and the vulnerability of the optic nerve.

It is unfortunate that no test exists by which the threat to optic nerve function can be assessed. There is good evidence that one important factor is insufficiency of the vascular supply to the nerve. Following this lead, some promising research is being done by Harrington[2] at the University of California, and Drance[1] at the University of Saskatoon. By use of an ophthalmodynamometer or a Kukan suction cup, the intraocular pressure is increased until a Bjerrum's scotoma is produced. If further experience confirms that permanent nerve damage is imminent when this scotoma is produced at low intraocular pressure levels, the surgeon will be able to choose more precisely the proper time for filtering operations.

490 Post Street, San Francisco 2.

REFERENCES

1. Drance, T. W.: Personal communication.

2. Harrington, D. O.: Pathogenesis of the glaucomatous visual field defects: Individual variations in pressure sensitivity. Josiah Macy, Jr., Foundation Glaucoma Conference, Fifth Conference, 1960.